

IN THE CLAIMS:

Please cancel claims 1-6, 9, 16, 17, 24, 25, 30, 32, 33, 35, 36, and 38; please amend claims 7, 11, 12, 14, 19, 20, 22, 27, 28, 31, 34, and 37; and please add new claims 39-57, as follows:

Claims 1-6. (Canceled)

Claim 7. (Currently Amended): A system for processing a substrate, comprising:
at least one atomic layer deposition barrier chamber for depositing a barrier layer comprising tantalum nitride;

at least one physical vapor deposition metal seed chamber for depositing a copper alloy seed layer over the barrier layer, wherein the copper alloy seed layer comprises copper and a metal selected from the group consisting of aluminum, magnesium, titanium, zirconium, tin, and combinations thereof and wherein the metal is present in the copper alloy in a concentration between about 0.01 atomic percent and about 2.0 atomic percent.

Claims 8-10. (Canceled)

Claim 11. (Currently Amended) The system of claim 7, wherein the physical vapor deposition metal seed chamber is a high density plasma physical vapor deposition metal seed chamber.

Claim 12. (Currently Amended) The system of claim 7, further comprising one or more transfer chambers for transferring a substrate between the atomic layer deposition barrier chamber and the physical vapor deposition metal seed chamber.

Claim 13. (Canceled)

Claim 14. (Currently Amended) A system for processing a substrate, comprising:

at least one atomic layer deposition barrier chamber for depositing a barrier layer comprising tantalum nitride;

at least one physical vapor deposition copper alloy seed chamber for depositing a copper alloy seed layer over the barrier layer, wherein the copper alloy seed layer comprises copper and a metal selected from the group consisting of aluminum, magnesium, titanium, zirconium, tin, and combinations thereof, and

at least one physical vapor deposition undoped copper seed chamber for depositing an undoped copper seed layer over the copper alloy seed layer.

Claims 15-18. (Canceled)

Claim 19. (Currently Amended) The system of claim 14, wherein the physical vapor deposition copper alloy seed chamber is a high density plasma physical vapor deposition copper alloy seed chamber and the physical vapor deposition undoped copper seed chamber is a high density plasma physical vapor deposition undoped copper seed chamber.

Claim 20. (Currently Amended) The system of claim 14 ~~claim 15~~, further comprising one or more transfer chambers for transferring a substrate between the atomic layer deposition barrier chamber, the physical vapor deposition copper alloy seed chamber, and the physical vapor deposition undoped copper seed chamber.

Claim 21. (Canceled)

Claim 22. (Currently Amended) A system for processing a substrate, comprising:

at least one atomic layer deposition barrier chamber for depositing a barrier layer comprising tantalum nitride;

at least one physical vapor deposition metal seed chamber for depositing a metal seed layer over the barrier layer, wherein the metal seed layer comprises a metal selected from the group consisting of aluminum, magnesium, titanium, zirconium, tin, and combinations thereof, and

at least one physical vapor deposition undoped copper seed chamber for depositing an undoped copper seed layer over the metal seed layer.

Claims 23-26. (Canceled)

Claim 27. (Currently Amended) The system of ~~claim 23~~ claim 22, wherein the physical vapor deposition metal seed chamber is a high density plasma physical vapor deposition metal seed chamber and the physical vapor deposition undoped copper seed chamber is a high density plasma physical vapor deposition undoped copper seed chamber.

Claim 28. (Currently Amended) The system of ~~claim 23~~ claim 22, further comprising one or more transfer chambers for transferring a substrate between the atomic layer deposition barrier chamber, the physical vapor deposition metal seed chamber, and the physical vapor deposition undoped copper seed chamber.

Claims 29-30. (Canceled)

Claim 31. (Currently Amended) The system of claim 7 ~~claim 30~~, wherein the copper alloy seed layer is deposited directly on the TaN barrier layer comprising tantalum nitride.

Claims 32 -33. (Canceled)

Claim 34. (Currently Amended) The system of claim 14 ~~claim 33~~, wherein the copper alloy seed layer is deposited directly on the TaN barrier layer comprising tantalum nitride.

Claims 35-36. (Canceled)

Claim 37. (Currently Amended) The system of claim 22 ~~claim 36~~, wherein the metal seed layer is deposited directly on the ~~TaN~~ barrier layer comprising tantalum nitride.

Claim 38. (Canceled)

Claim 39. (New) The system of claim 7, wherein the copper alloy seed layer comprises the metal present in the copper alloy in a concentration between about 0.1 atomic percent and about 1.0 atomic percent.

Claim 40. (New) The system of claim 7, wherein the atomic layer deposition barrier chamber comprises a first source providing a tantalum containing compound and a second source providing a nitrogen containing compound.

Claim 41. (New) The system of claim 7, wherein the atomic layer deposition barrier chamber comprises a first source providing PDMAT and a second source providing ammonia.

Claim 42. (New) The system of claim 7, wherein the copper alloy seed layer comprises copper and aluminum.

Claim 43. (New) The system of claim 7, wherein the copper alloy seed layer comprises copper and titanium.

Claim 44. (New) The system of claim 14, wherein the copper alloy seed layer comprises the metal present in the copper alloy in a concentration between about 0.001 atomic percent and about 5.0 atomic percent.

Claim 45. (New) The system of claim 14, wherein the copper alloy seed layer comprises the metal present in the copper alloy in a concentration between about 0.01 atomic percent and about 2.0 atomic percent.

Claim 46. (New) The system of claim 14, wherein the atomic layer deposition barrier chamber comprises a first source providing a tantalum containing compound and a second source providing a nitrogen containing compound.

Claim 47. (New) The system of claim 14, wherein the atomic layer deposition barrier chamber comprises a first source providing PDMAT and a second source providing ammonia.

Claim 48. (New) The system of claim 14, wherein the copper alloy seed layer comprises copper and aluminum.

Claim 49. (New) The system of claim 14, wherein the copper alloy seed layer comprises copper and titanium.

Claim 50. (New) The system of claim 22, wherein the atomic layer deposition barrier chamber comprises a first source providing a tantalum containing compound and a second source providing a nitrogen containing compound.

Claim 51. (New) The system of claim 22, wherein the atomic layer deposition barrier chamber comprises a first source providing PDMAT and a second source providing ammonia.

Claim 52. (New) A system for processing a substrate, comprising:

- at least one atomic layer deposition barrier chamber comprising a first source providing a tantalum containing compound and a second source providing a nitrogen containing compound;

- at least one physical vapor deposition metal seed chamber having a copper alloy target comprising copper and a metal selected from the group consisting of aluminum, titanium, and combinations thereof and wherein the metal is present in the copper alloy target in a concentration between about 0.001 atomic percent and about 5.0 atomic percent; and

at least one transfer chamber for transferring the substrate between the atomic layer deposition barrier chamber and the physical vapor deposition metal seed chamber.

Claim 53. (New) The system of claim 52, wherein the metal is present in the copper alloy target in a concentration between about 0.01 atomic percent and about 2.0 atomic percent.

Claim 54. (New) The system of claim 53, wherein the metal is present in the copper alloy target in a concentration between about 0.1 atomic percent and about 1.0 atomic percent.

Claim 55. (New) The system of claim 53, wherein the copper alloy target consists essentially of copper and aluminum.

Claim 56. (New) The system of claim 53, wherein the copper alloy target consists essentially of copper and titanium.

Claim 57. (New) The system of claim 52, wherein the first source of the atomic layer deposition barrier chamber provides PDMAT and the second source of the atomic layer deposition barrier chamber provides ammonia.